

FIG. 1

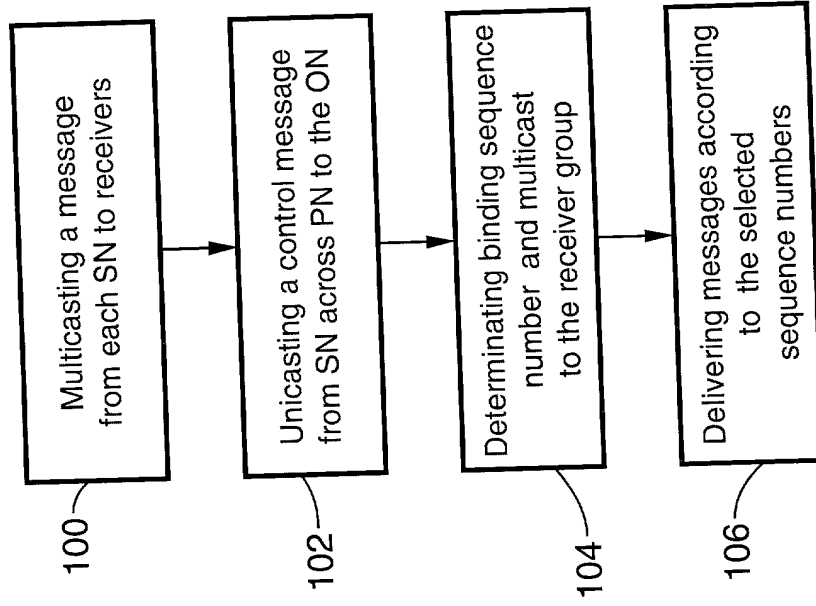


FIG. 2

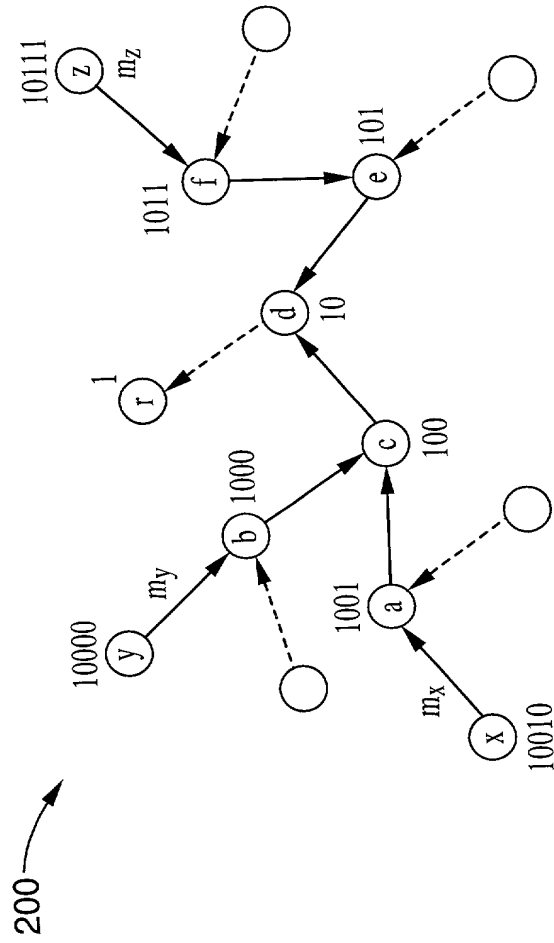


FIG. 3

200

```

proc TOM (node i)
Cobegin
    TOM_send(); TOM_receive()
Coend
proc TOM_send (message  $m^b$ , receivers Rec)
Begin /* i is SN */
    If  $m \neq 0$  And  $i = \text{SN}(m)$ 
    Then  $m^h = (l(i)\_Rec, \text{seq\_}\#, \_, \text{false})$ 
         $m = (m^h, m^b)$ 
        reliable_multicast(m, Rec)
        TOM_cast( $m^h$ , parent(i))
    End
proc TOM_cast (message m, receiver rec)
Begin /* self-route from node i to rec */
    If  $ll(i) > ll(\text{receiver})$ 
    OrIf  $l(i) \neq \text{prefix}(\text{rec})$ 
    Then If  $\exists \text{parent}(i)$ 
        Then unicast(m) to parent(i)
    Else If  $\exists \text{children}(i)$ 
        Then unicast(m) to child(i)
            where  $l(\text{child}(i)) = \text{prefix}(l(\text{rec}))$ 
    End
proc TOM_receive (message m; receivers Rec)
Begin
    If  $i \notin \text{Rec}(m)$  /* i is EN */
    Then unicast(m) to parent(i);
    Else If  $\text{of}(m) = \text{false}$  And  $m^b = 0$  /* i is pN */
    Then tag with new seq#;
        TOM_cast(m, parent(i))
    Else If  $l(i) \in \text{Rec}$  /* i is RN */
    Then If  $m^b \neq 0$ . And  $\text{of}(m) = \text{false}$ 
        Then insert ( $m^b, uw$ )
        Else shift m from  $uw$  to  $ow$ 
        deliver(head( $ow$ ), local processes)
    Else compute longest common prefix  $lcp = (m, pm)$ 
        If  $lcp = l(i)$  /* i is ON */
        And (query parent(i) for pending msgs = 0)
        Then Forall msgs in  $uw$  select seq#s
            shift msgs with set seq#s into  $ow$ 
            TOM_cast(head( $ow$ , Rec))
    End
End

```

FIG. 4

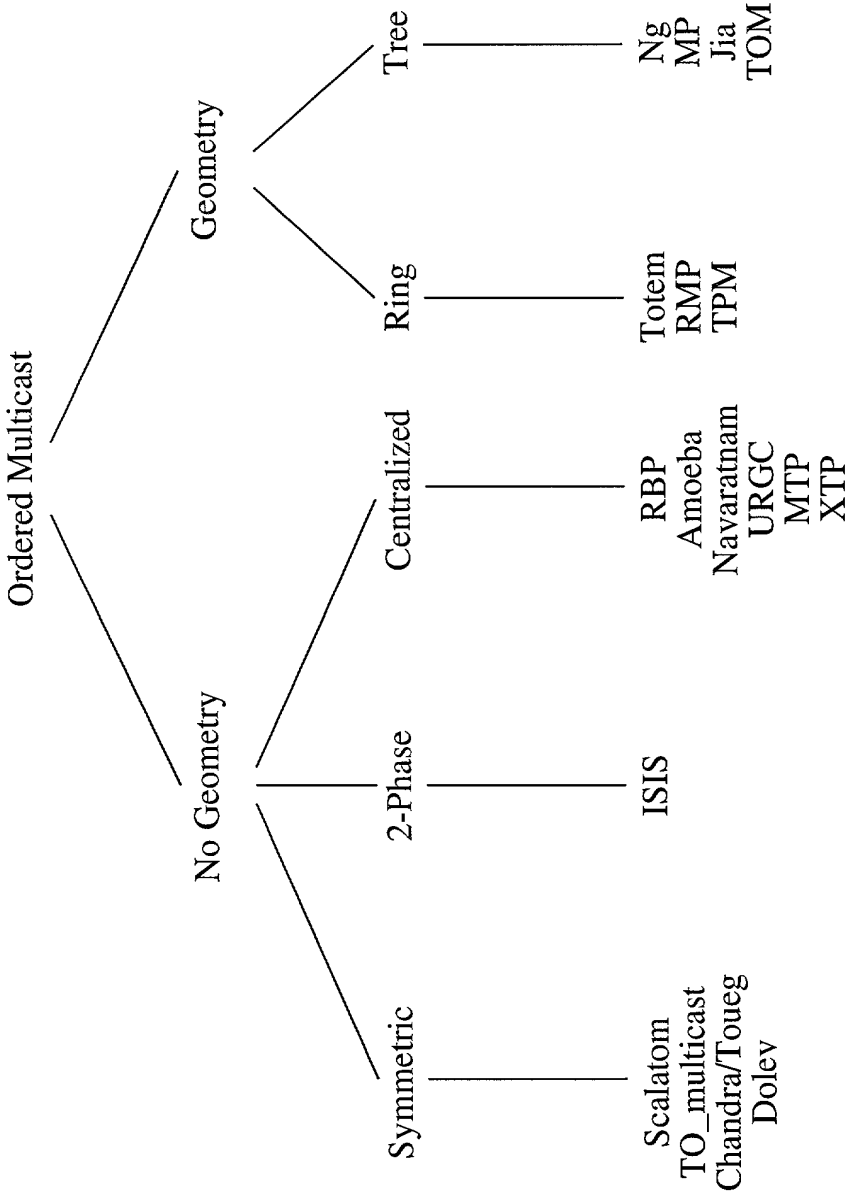


FIG. 5

